

# The MATLAB Environment

## Week 2

**MEMS 1140—Introduction to Programming in Mechanical  
Engineering**

# Learning Objectives (L.O.)

At the end of this lecture, you should understand/be able to:

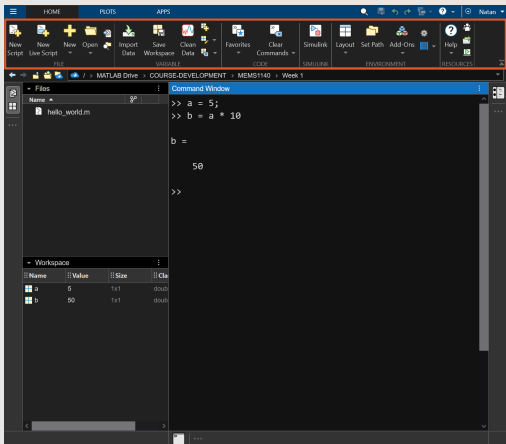
- ❑ The purposes and locations of the panels in MATLAB;
- ❑ Create a basic file organization structure;
- ❑ The purpose of a MATLAB script;
- ❑ Create a script;
- ❑ The purpose of the Editor environment;
- ❑ File paths and the Current Directory.

# Table of Contents (ToC)

1. The MATLAB Interface
2. File Organization
3. What are MATLAB Scripts
4. Creating a MATLAB Script
5. The Editor Environment
6. File Path in MATLAB
7. Summary

# 1 – The MATLAB Toolbar

The **Toolbar** contains buttons for interacting with the program in various ways.



⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

# 1 – Toolbar Options — New Script

⇒ L.O.1

□ L.O.2

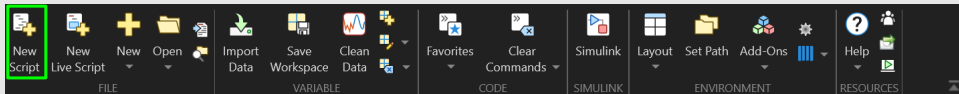
□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

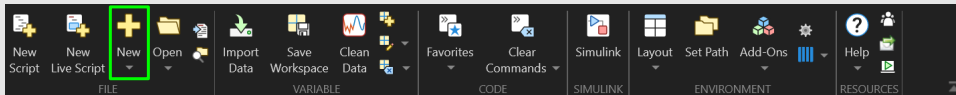
## New Script



The New Script button is a quick shortcut to create a new MATLAB script file (.m), which will be covered later in this lecture.

# 1 – Toolbar Options — New

## New



The New button contains options to create various files, templates, and folders.

⇒ L.O.1

□ L.O.2

□ L.O.3

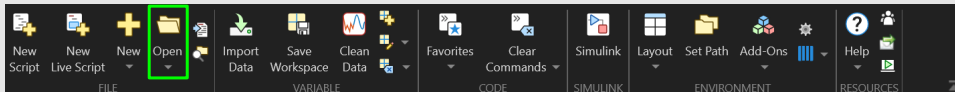
□ L.O.4

□ L.O.5

□ L.O.6

# 1 – Toolbar Options — Open

## Open



The Open button enables you to navigate through and open any of your MATLAB files.

⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

# 1 – Toolbar Options — Import Data

⇒ L.O.1

□ L.O.2

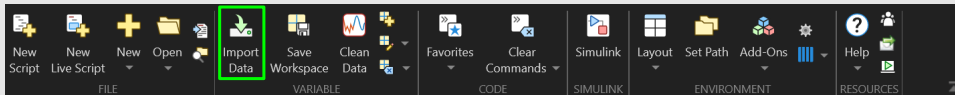
□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

## Import Data



The Import Data button enables you to load data from various source files, including MATLAB's native .mat file format.



# 1 – Toolbar Options — Save Workspace

⇒ L.O.1

□ L.O.2

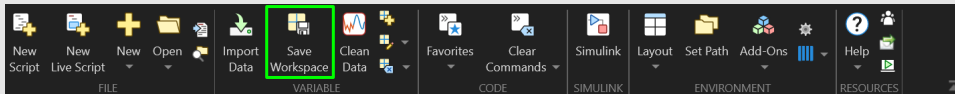
□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

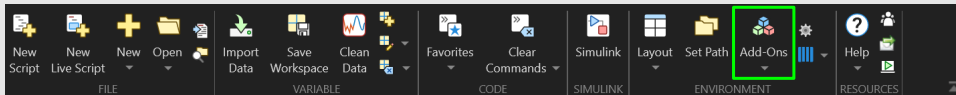
## Save Workspace



The Save Workspace button enables you to save every variable that is currently loaded in the Workspace to a .mat file. This can be a very powerful tool for saving progress.

# 1 – Toolbar Options — Addons

## Addons



The Addons button lists every Toolbox currently installed on your system. With a Desktop installation, you will use this menu to install Toolboxes. MATLAB Online automatically loads all Mathworks Toolboxes.

⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

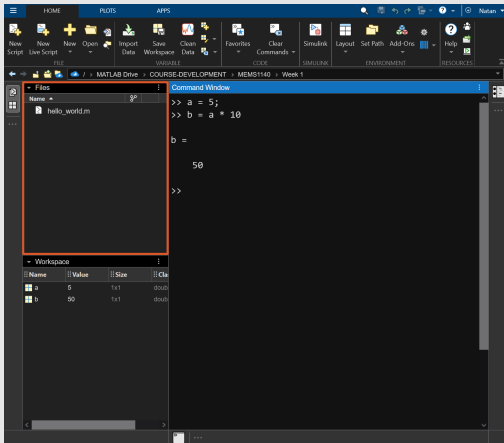
□ L.O.5

□ L.O.6

# 1 – File Explorer

The **Files** frame contains a list of all files that exist within the current directory.

Note the .m script already located here!



⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

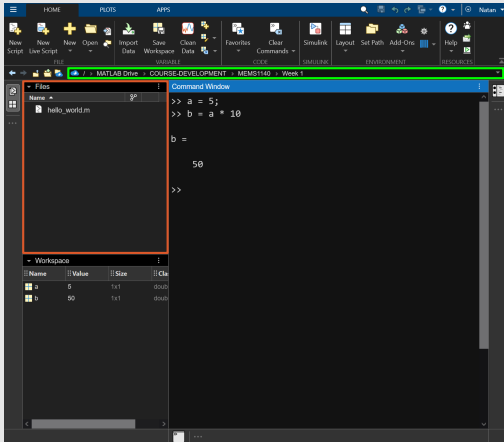
□ L.O.5

□ L.O.6

# 1 – File Explorer

The **Files** frame contains a list of all files that exist within the current directory.

You can see the current directory as a folder path underneath the toolbar.



⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

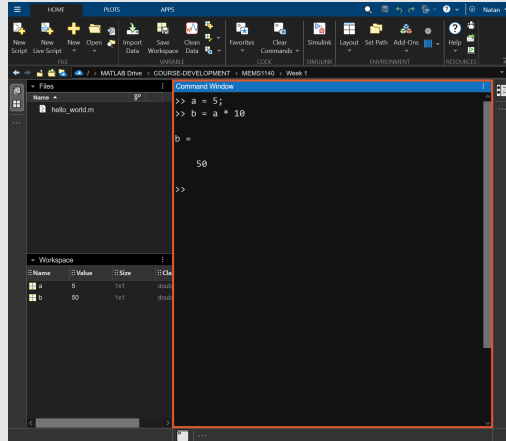
□ L.O.5

□ L.O.6

# 1 – Command Window

The **Command Window** is an environment where MATLAB code can be written line-by-line.

It is also the natural place to print the output from running scripts, as will be covered later in this lecture.



⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

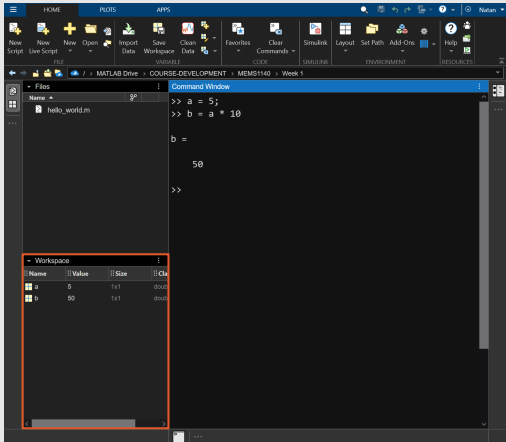
□ L.O.5

□ L.O.6

# 1 – Workspace

The **Workspace** frame contains all variables, their values, and other attributes when they are created.

Note the variables **a** and **b**, which are saved as a result of the operations in the Command Window



⇒ L.O.1

□ L.O.2

□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

## 2 – File Organization

In this course, you will write many different scripts for practice each week.

It is important to organize your work to simplify navigating through it.

Thus, creating folders to organize all of your code will be extremely valuable.

✓ L.O.1

⇒ L.O.2

□ L.O.3

□ L.O.4

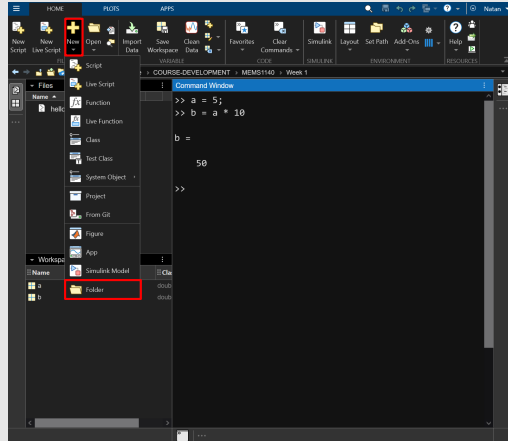
□ L.O.5

□ L.O.6

## 2 – Create a Folder

Click Folder under the New menu in the Toolbar:

Create a base folder for this course and new folders within it for each week of the semester.



✓ L.O.1

⇒ L.O.2

□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6



## 2 – Folder Structure

For some guidance, here is an example folder tree that you can emulate.

---

```
> MATLAB Drive/      % root folder in cloud storage
--> MEMS1140/         % class-specific folder
----> Week 1/         % week-specific folder
----> Week 2/
----> Week 3/
...

```

---

This structure neatly organizes everything by week, so it is very easy to find your work to reference later.

✓ L.O.1

⇒ L.O.2

□ L.O.3

□ L.O.4

□ L.O.5

□ L.O.6

# 3 – What are MATLAB Scripts?

MATLAB code is executed in the MATLAB environment.

The simplest way to execute code is with one-line operations in the Command Window, as seen in the [tour of the interface](#) earlier.

A script is simply a long list of MATLAB operations that can be executed together as one unit.

✓ L.O.1

✓ L.O.2

⇒ L.O.3

□ L.O.4

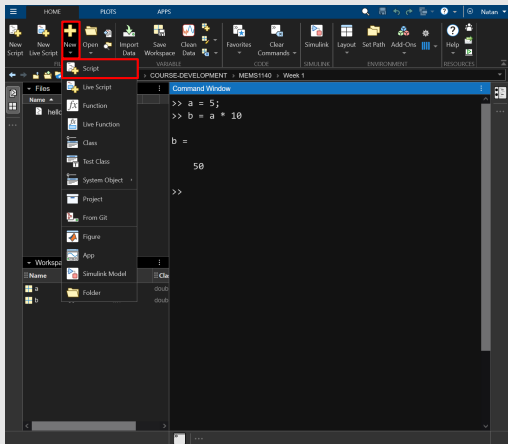
□ L.O.5

□ L.O.6

## 4 – Creating a MATLAB Script

Inside your new folder, click Script under the New menu in the Toolbar:

This opens an Editor window with an untitled script.

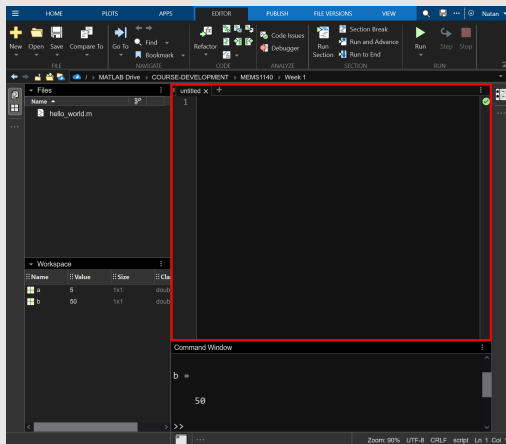


- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ⇒ L.O.4
- L.O.5
- L.O.6

## 5 – The Editor

Here, you can see the new Editor window.

This Editor is where we will write and execute code in scripts throughout this course.

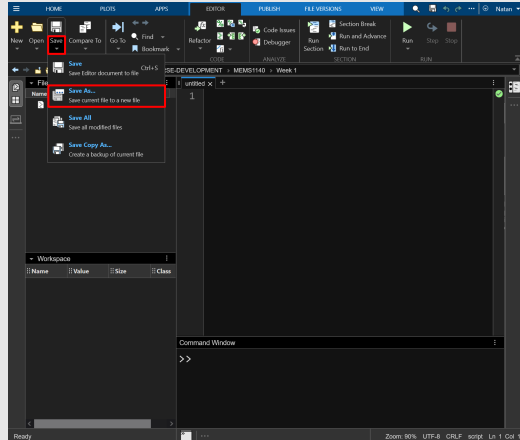


- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

# 5 – Saving a Script

We can save the untitled file as a new script.

Click on Save As in the dropdown of the Save menu.



✓ L.O.1

✓ L.O.2

✓ L.O.3

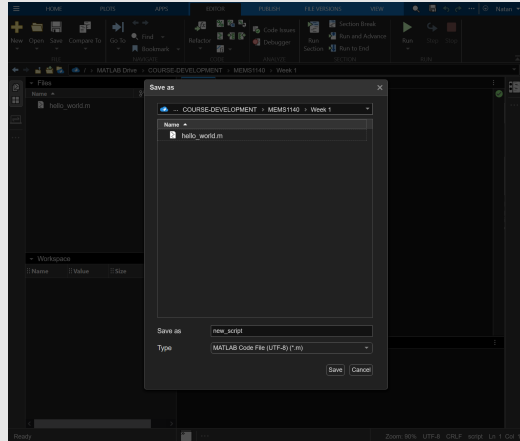
✓ L.O.4

⇒ L.O.5

□ L.O.6

# 5 – Saving a Script

This opens up the following saving context window.



- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

## 5 – Saving a Script

Enter a name for the file next to “Save as.”

The file name should be short and capture the essence of the code within.

For this demo, **new\_script** adequately captures the purpose of this file.

✓ L.O.1

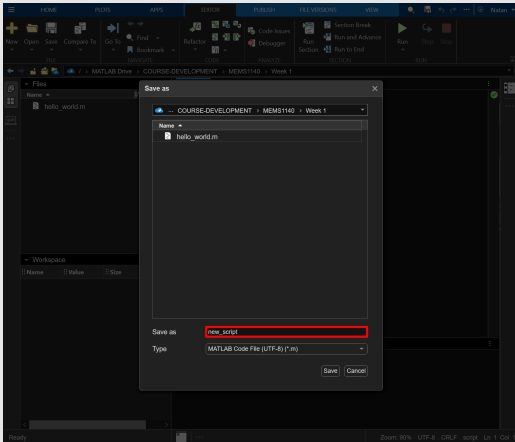
✓ L.O.2

✓ L.O.3

✓ L.O.4

⇒ L.O.5

□ L.O.6

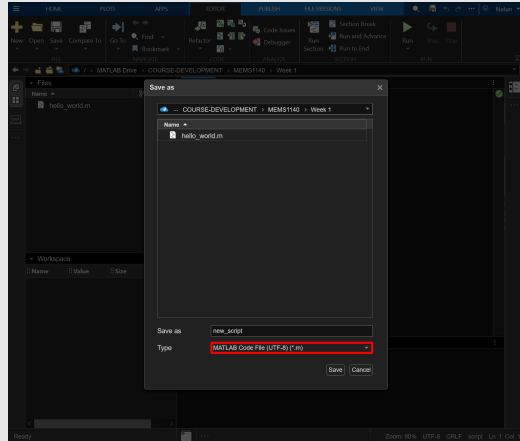


## 5 – Saving a Script

Ensure that the file type is correct.

It should say “MATLAB Code File (UTF-8) (\*.m)”

- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

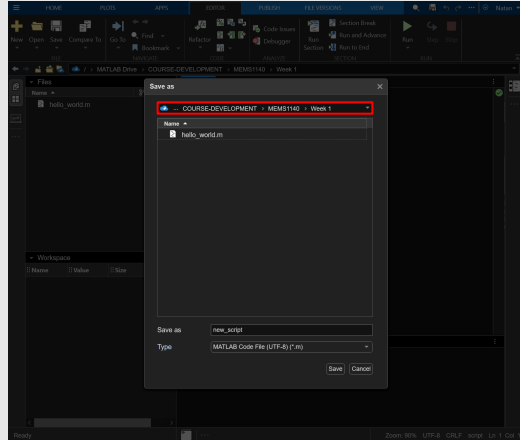




## 5 – Saving a Script

Finally, ensure that the file is saved to the correct location.

Check the folder path at the top.



✓ L.O.1

✓ L.O.2

✓ L.O.3

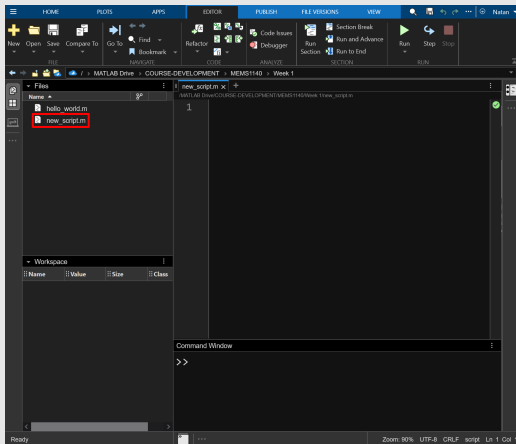
✓ L.O.4

⇒ L.O.5

□ L.O.6

# 5 – After Saving a Script

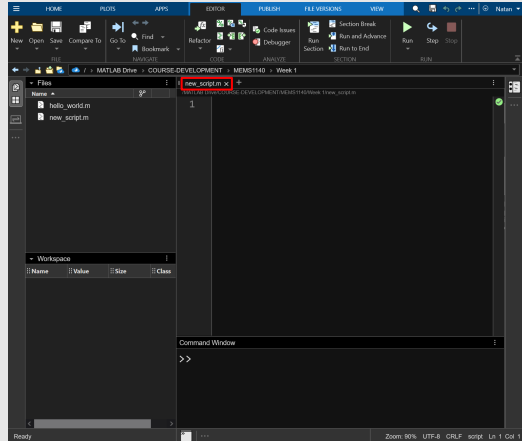
After saving a script, it will be visible in the Files panel.



- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

## 5 – After Saving a Script

The editor tab will also be renamed to reflect the name assigned during the save process.

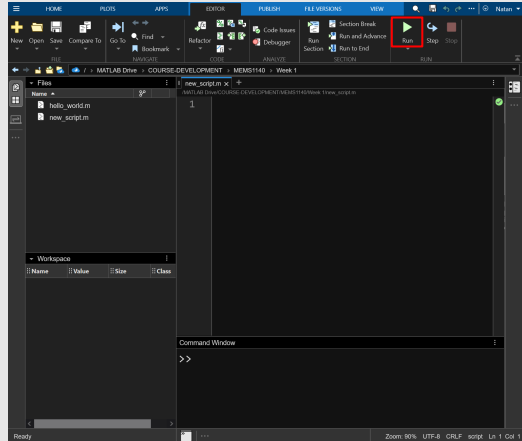


- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

## 5 – After Saving a Script

In order to execute code in a script, click the Run button in the Toolbar.

Future lectures will cover how to write scripts, at which point this functionality will be better demonstrated.



- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ⇒ L.O.5
- L.O.6

## 6 – File Path in MATLAB

A file path refers to the *location* of a file in a folder structure.

---

```
> MATLAB Drive/  
--> COURSE-DEVELOPMENT/  
----> MEMS1140/  
-----> Week 1/  
-----> hello_world.m
```

---

The file path for the hello world script in the above tree is:

---

```
MATLAB Drive/COURSE-DEVELOPMENT/MEMS1140/Week 1/hello_world.m
```

---

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

## 6 – Executing from the Correct Folder

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

It is important to execute scripts from inside of the correct folder.

If we hit Run on the `hello_world` script from inside of the **MEMS1140** folder instead of the **Week 1** folder, MATLAB will attempt to run code at the following path:

---

**MATLAB Drive/COURSE-DEVELOPMENT/MEMS1140/hello\_world.m**

---

which does not match the actual filepath shown previously.

## 6 – Incorrect Folder Error

The following error window will open:



This message lists the full file path of the file being run, and states that it is not located in the current folder, in this case, **MEMS1140** (Recall that it is *actually* located in **Week 1**).

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

## 6 – Error Options—Change Folder

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

The option ***Change Folder*** is recommended for this situation.

This automatically changes your Current Directory to the folder containing the script that is being run.

In our example

Path ***before*** Change Folder: MATLAB Drive/COURSE-DEVELOPMENT/MEMS1140

Path ***after*** Change Folder: MATLAB Drive/COURSE-DEVELOPMENT/MEMS1140/Week 1



## 6 – Error Options—Add to Path

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

The option **Add to Path** is more complicated.

### What is the Path

---

The MATLAB Path stores a very long list of folders for MATLAB to check whenever code is executed.

If the code being run does not exist in the Current Folder, but it does exist in another folder that is listed in the MATLAB Path, it can be executed.

## 6 – Error Options—Add to Path

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

⇒ L.O.6

The option **Add to Path** will add the *folder* that contains the script being run to the existing list of folders in MATLAB Path.

MATLAB will then be able to access any scripts and functions within that folder, from anywhere else.

### Warning

---

This option is more advanced. Thus, it is recommended that you select **Change Folder** instead.

# 7 – Summary

This lecture covered:

- ✓ The purposes and locations of the panels in MATLAB

The Toolbar contains buttons. Files lists every file in the current directory. The Command Window is an environment to execute code and see displayed output. And the Workspace lists all variables currently loaded in MATLAB.

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

✓ L.O.6

## 7 – Summary

### ✓ How to create a basic file organization structure

In the Toolbar, click New and then Folder to create a new folder.  
Then create a folder structure to organize your code by each week.

### ✓ The purpose of a MATLAB script

Scripts are simply a collection of individual MATLAB commands that can be executed together as one file, rather than separately in Command Window.

- ✓ L.O.1
- ✓ L.O.2
- ✓ L.O.3
- ✓ L.O.4
- ✓ L.O.5
- ✓ L.O.6

# 7 – Summary

## ✓ How to create a script

Create a new script with the button in the Toolbar. This opens an empty, untitled Editor tab.

## ✓ The purpose of the Editor environment

The Editor is used to edit MATLAB scripts. It is opened by creating a new script or by opening a script from the File panel.

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

✓ L.O.6

# 7 – Summary

## ✓ File paths and the current directory

File paths are the location of a file in the folder structure. The current directory refers to the folder in which your MATLAB environment is presently located.

It is important to run scripts from inside of the correct folder. Otherwise, there will be an error.

✓ L.O.1

✓ L.O.2

✓ L.O.3

✓ L.O.4

✓ L.O.5

✓ L.O.6